

1. Record Nr.	UNINA9910298285503321
Titolo	Mathematical Approaches to Biological Systems : Networks, Oscillations, and Collective Motions // edited by Toru Ohira, Tohru Uzawa
Pubbl/distr/stampa	Tokyo : , : Springer Japan : , : Imprint : Springer, , 2015
ISBN	4-431-55444-0
Edizione	[1st ed. 2015.]
Descrizione fisica	1 online resource (171 p.)
Disciplina	519 570 570285
Soggetti	Bioinformatics Computational biology Systems biology Neural networks (Computer science) Computer Appl. in Life Sciences Systems Biology Mathematical Models of Cognitive Processes and Neural Networks Computational Biology/Bioinformatics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters.
Nota di contenuto	1 Human Balance Control: Dead Zones, Intermittency, and Micro-Chaos (John Milton, Tamas Insperger, and Gabor Stepan) -- 2 Dynamical Robustness of Complex Biological Networks (Gouhei Tanaka, Kai Morino, and Kazuyuki Aihara) -- 3 Hardware-Oriented Neuron Modeling Approach by Reconfigurable Asynchronous Cellular Automaton (Takashi Matsubara and Hiroyuki Torikai) -- 4 Entrainment Limit of Weakly Forced Nonlinear Oscillators (Hisa-Aki Tanaka) -- 5 A Universal Mechanism of Determining the Robustness of Evolving Systems (Takashi Shimada) -- 6 Switching of Primarily Relied Information by Ants: A Combinatorial Study of Experiment and Modeling (Yusuke Ogiwara, Osamu Yamanaka, Toshiaki Akino, Shunsuke Izumi, Akinori Awazu, and Hiraku Nishimori) -- 7 Chases and Escapes: From Singles

to Groups (Atsushi Kamimura, Shigenori Matsumoto, and Toru Ohira).

Sommario/riassunto

This book presents the most recent mathematical approaches to the growing research area of networks, oscillations, and collective motions in the context of biological systems. Bringing together the results of multiple studies of different biological systems, this book sheds light on the relations among these research themes. Included in this book are the following topics: feedback systems with time delay and threshold of sensing (dead zone), robustness of biological networks from the point of view of dynamical systems, the hardware-oriented neuron modeling approach, a universal mechanism governing the entrainment limit under weak forcing, the robustness mechanism of open complex systems, situation-dependent switching of the cues primarily relied on by foraging ants, and group chase and escape. Research on different biological systems is presented together, not separated by specializations or by model systems. Therefore, the book provides diverse perspectives at the forefront of current mathematical research on biological systems, especially focused on networks, oscillations, and collective motions. This work is aimed at advanced undergraduate, graduate, and postdoctoral students, as well as scientists and engineers. It will also be of great use for professionals in industries and service sectors owing to the applicability of topics such as networks and synchronizations.
